REMARKS

Introduction

Receipt of the Office Action mailed July 12, 2006 is acknowledged. Claim 1 has been amended in formal regards to insert the complete term for the acronym objected to by the Examiner. The word "aluminum" replaces "aluminium" according to the custom usage in the United States. Claim 1 has also been amended to clarify that the solution heat treatment is conducted after the friction stir welding. Support for this amendment can be found throughout the specification and claims as originally filed, for example in original claim 15. No new matter has been added. Entry of the amendment and favorable reconsideration are earnestly solicited.

Election/Restrictions

Applicants respectfully request rejoinder of the nonelected claims under the *In re Ochiai* guidelines after allowance.

Drawings

Formal drawings will be submitted upon allowance.

Claim Rejection – 35 U.S.C. §112

Claims 1-14 were rejected under 35 U.S.C. 112, second paragraph, as allegedly being indefinite. It is respectfully submitted that this rejection is now moot in view of the instant amendment to claim 1. AED is the French acronym for DSC (AED = Analyse Enthalpique Différentielle). AED has now been replaced with the English language usage, Differential Scanning Calorimetry. This is supported by the paragraph [0016] of the published application.

Claims Rejections – 35 U.S.C. §103

Claims 1-14 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over either Litwinski (US patent No. 6,780,525) or Waldron et al (US Patent No. 6,168,067) in view

of Benedictus et al (WO 2004/001086, see US Equivalent US Patent No. 6,994,760). This rejection is respectfully traversed for at least the following reasons.

First of all, contrary to the position advanced by the Examiner, Waldron and Litwinski do not disclose equivalent processes. For one, Waldron does not disclose conducting solution heat treatment of a friction stir welded part.

To wit, Waldron teaches (column 2 lines1 to 14)

- solution heat treating a structural member
- quenching
- friction stir welding
- aging

While Waldron teaches a cooling of the weld called "quenching" during the moving step (that is, during friction stir welding, see column 2 lines 25-26), this type of operation does not constitute a solution heat treatment and quenching of the structural assembly after friction stir welding as instantly claimed. Waldron does not teach a solution heat treatment after welding but rather, discloses a precipitation hardening known as natural or artificial aging (see column 2 line 13-14 and column 6 lines 12-16).

A process wherein the solution heat treatment is conducted after friction stir welding generally results in uncontrolled grain growth (see [0013] of the published pending application). By conducting a process as claimed wherein a heat treatment at a temperature T for at least $2t_1$, wherein t_1 comprises a minimum treatment duration at temperature T leading to a specific melting peak energy defined by Differential Scanning Calorimetry and less than 1 J/g; relatively homogeneous grain size in the welded zones is achieved after solution heat treatment, thereby improving stability as well as mechanical behavior (see [0032] of the published pending application). In contrast, in Waldron, the solution heat treatment is conducted before friction stir welding. The process taught by Waldron cannot solve the same problem as the instant application because it does not encounter the same uncontrolled grain growth and related joint

stability and mechanical behavior problem. On the other hand, while Litwinski teaches a solution heat treatment of a welded assembly, there is no teaching in Litwinski to subject the elements to a heat treatment twice as long as the typical duration of solution heat treatment. This feature is positively recited in claim 1 which states subjecting at least two elements made from the same alloy or different alloys to heat treatment at a temperature T for at least $2t_1$, wherein t_1 comprises a minimum treatment duration at temperature T leading to a specific melting peak energy defined by Differential Scanning Calorimetry and less than 1 J/g.

By conducting the process for at least twice as long as a minimum treatment duration as defined by DSC, coalescence of the dispersoids is produced (see [0024] of the pending application). Dispersoids are well known as constituting fine precipitates that form during high-temperature thermal operations, e.g., $ZrAl_3$, $Al_{12}(FeMn)_3Si$, $Al_{12}Mg_2Cr$, etc. Contrary to the phase associated with main alloying elements (eg Cu), dispersoids do not dissolve during high temperature thermal treatments. Litwinski teaches using a standard heat treatment designed to obtain dissolution of the phase associated with the secondary alloying element (column 7 line 20-22). Litwinski fails to teach or suggest employing at least two t_1 periods. Thus Litwinski's process would be insufficient to obtain coalescence of dispersoids, since the duration of heat treatment is too short.

Thus, neither Walton nor Litwinski teach or suggest the features of claim 1, much less those features of the dependent claims. The secondary references fail to provide for the deficiencies of these two primary references. Thus, the instant rejection is improper and should be withdrawn.

The Office Action relies on Benedictus WO 2004/001086 for the rejection of claims other than claims 1 and 12. Applicants respectfully submit that this reliance is improper. WO 2004/001086 has a publication date of December 31, 2003, *after* the priority date of the instant application of May 20, 2003. Even the prior art date under 35 U.S.C. § 102(e) of the U.S. equivalent of WO 2004/001086 (U.S. Patent No. 6,994,760) was only June 02, 2003. Thus, Neither of these Benedictus documents are properly prior art to this instant application. For this

reason alone, it is respectfully submitted that the rejections are improper and should be withdrawn.

In any vent, contrary to the assertion of the Office Action (see page 5 line 10), Benedictus does not teach a heat treatment schedule *following* the welding process. The passage cited by the Office Action mentions the welding process, but nothing about treatment after welding. There is no indication at all in Benedictus to a solution heat treatment and quenching of the welded parts.

Benedictus teaches pre-heat and homogenization conditions which improve properties of the products such as da/dN (column 5 lines 32-35) before welding. There is no indication in Benedictus that such a thermal treatment would improve the grain size of the solution heat treated and quenched welded joint. Thus, even if Benedictus were prior art, it would not have in any way rendered the instantly claimed method or part obvious.

In view of the above amendment and foregoing remarks, Applicants believe the pending application is in condition for allowance.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 11-0553, under Order No. 2901683.19, from which the undersigned is authorized to draw.

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Respectfully submitted,

By_____

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